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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,834	03/22/2001	Jae Sung Roh	0465-0826P	3138

2292 7590 12/23/2002

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EXAMINER

OWENS, DOUGLAS W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 12/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/813,834

Applicant(s)

ROH ET AL.

Examiner

Douglas W Owens

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 22 August 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on August 22, 2002 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

2. The Patent and Trademark Office no longer makes drawing changes. See 1017 O.G. 4. It is applicant's responsibility to ensure that the drawings are corrected.

Corrections must be made in accordance with the instructions below.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

1. **Correction of Informalities -- 37 CFR 1.85**

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

2. **Corrections other than Informalities Noted by Draftsperson on form PTO-948.**

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

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Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5 – 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation, "...a first conductor structure and a second conductor structure formed...except...in a region between the first and second conductor structures..." The scope of the claim is vague since the structural relationship of the first and second conductor structures are described in terms of itself.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

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6. Claims 1, 2 and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by US patent No. 6,479,853 to Chishiki.

Regarding claim 1, Chishiki teaches a semiconductor device, having a self-aligned contact hole, the device comprising (Fig. 3A for example, see also Figs. 8A, 11C, 14A, 16B and 21A):

a substrate (301);

a first and second conductor structure (304);

an insulator structure (310a, 320a) on the first and second conductor structure and the substrate except in a region between the first and second conductor structures; and

sidewall spacers (322) formed to abut a side of the conductor structures and a side of the insulator structure and manifesting a self-aligned contact hole between the first and second conductor structures.

Regarding claim 2, Chishiki teaches a semiconductor device, wherein the first and second conductor structures are gate structures.

Regarding claim 4, Chishiki teaches a semiconductor device, further comprising:

a contact plug (327) formed in the self-aligned contact hole.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chishiki as applied to claim 1 above, and further in view of US patent No. 5,705,838 to Jost et al.

Chishiki teaches a semiconductor device, wherein the first and second conductor structures comprise:

- a gate oxide layer (303) on the substrate; and
- a conductive layer (304, 303) on the gate oxide layer.

Chishiki does not teach a semiconductor device, further including a gate cap insulating layer on the conductive layer. Jost et al. teaches a semiconductor device with a gate cap insulating layer (18) on a conductive layer (12, 14). It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Jost et al. into Chishiki, since it is desirable to prevent unwanted diffusion of impurities (See. Jost et al., Col. 3, lines 14 – 19).

9. Claims 5 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 6,483,138 to Habu et al. in view of US patent No. 5,790,452 to Lien.

Regarding claims 5 and 6, Habu et al. teaches a semiconductor device (Fig. 7D, for example) comprising:

- a substrate with impurities in it;
- a first and second conductor structure (2);
- an insulator structure (10) on the first and second conductor structure and the substrate except in a region between the first and second conductor structures; and

sidewall spacers (3',6') formed to abut a side of the conductor structures and a side of the insulator structure and manifesting a self-aligned contact hole between the first and second conductor structures.

Habu et al. does not teach an unsymmetrical semiconductor device, wherein the impurity concentration of a first region is different from that of a second region. Lien teaches an unsymmetrical semiconductor device (Fig. 4) having one impurity concentration in one region and another impurity concentration in another region. It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Lien into the device taught by Habu et al. since it is desirable to reduce hot carrier effects.

Regarding claim 7, Habu et al. teaches a semiconductor device, further comprising:

a contact plug (13) in the self-aligned hole, wherein the contact plug is in direct contact with the first sidewall spacers and first impurity region, the contact plug in contact with the first sidewall spacers and the first impurity region.

Regarding claim 8, Habu et al. does not teach the contact plug is in contact with a bit line. Lien teaches forming a connection between from the source to a bit line (Fig. 5). It would have been obvious to one of ordinary skill in the art to connect the contact plug to a bit line since it is desirable to read bits of data in an IC in order to execute programmed instructions.

Regarding claim 9, Habu et al. teaches a semiconductor device, wherein the contact plug is not disposed directly above the first and second conductor structures.

Response to Arguments

10. Applicant's arguments with respect to claims 1 - 9 have been considered but are moot in view of the new ground(s) of rejection.

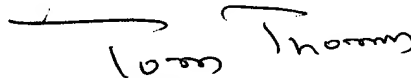
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 703-308-6167. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DWO
December 16, 2002


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800